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Mindfulness: The Power of a Parent's Intentional Influence on a Prenate

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Abstract

There is a long history of provision of pre- and perinatal (PPN) education to expecting mothers, and less so to fathers. Due to inconsistencies in both research methodologies and subsequent study findings, understanding what constitutes best practice in PPN education programs remains unclear. This research study was the second of four in a PhD program of research that examined content and logistical factors perceived to be important when designing, developing, and delivering PPN parenting programs for the 21st century. In this study, 54 existing mothers and seven fathers (N=61) who had attended a PPN parenting program, completed an exploratory self-report online questionnaire that examined program content strengths, gaps and limitations. An outcome based on the utilization of Braun and Clarke's (2006) five-step thematic analysis process, was a perceived need to understand what mindfulness-based knowledge, skills, and tools expecting parents could be taught to promote heathy pregnancies, births, couples' relationship and transitions to parenthood. Findings from the current study were consistent with the literature on PPN psychology, mindfulness and neuroscience, which has theorized that parents' thoughts, emotions, beliefs, moods, state of mind, as well as quality of partner relationship during the time of pregnancy influences prenates. By developing a range of PPN parenting programs that include mindfulness skills, and measuring effectiveness through pre- and post-test randomized clinical trials, utilizing large sample sizes and control groups, outcomes may result in positive parenting and bonding pre- and post-birth, as well as a positive transition for couples from being partners to parents.

Keywords: mindfulness, intentionality, pre- and perinatal psychology, pre- and perinatal parenting education, pre- and perinatal parenting programs

Introduction

Research in the fields of pre and perinatal (PPN) psychology, neuroscience, mindfulness, and Attachment Theory has highlighted the importance of bringing contemplative practices (e.g., self-observation) into PPN parenting programs. It has been thought that doing so may influence expecting parents' level of connection and attunement to their developing prenate (Davis & Hayes, 2011). Some research has posited that expecting mothers' thoughts, emotions and behaviors experienced during pregnancy, may impact the prenate and their subsequent perception of the "world" (Lipton, 2008; Michaud, 2012).

Further, there has been a call for "early childhood policy and practice to have a better understanding of the extent to which early experiences are incorporated into the developing brain for better or for worse" (Shonkoff, 2011, p.982). Specifically, Shonkoff (2011) advocated for "interventions that will enhance the mental health executive function skills, self-regulation capacities of mothers beginning in pregnancy, and that suggest promising strategies to protect the developing brains of their children" (p. 983). Other authors have supported that mindfulness based interventions may also enhance secure bonding and attachment between mothers and their baby (Atzil, Hendler, & Feldman, 2013; Siegel, 2011).

Mindfulness Defined

Mindfulness has been defined as engaging in regular, habituated activities that consciously focus on being aware of, and influencing, what is happening in the body and mind in the present moment (Kabat-Zinn, 1990; Michaud, 2012). The intention of mindfulness is to cultivate greater levels of self and other awareness, leading to compassionate conscious choices (Baer, 2003; Burke, 2010; Kabat-Zinn, 1990; Michaud, 2012). This definition includes three key underpinnings of mindfulness. They are intention, attention, and attitude (IAA) (Shapiro, Carlson, Astin, & Freedman, 2006). *Intention* is the skill of consciously switching attention from unhelpful habits, thoughts and behaviors to options that are healthier for self and others (Burke, 2010). *Attention* has been defined as the ability to have focused and sustained attention on thoughts, emotions and actions, which may lead to intentional shifts away from less ideal to healthy choices (Kabat-Zinn, 1990). Mindfulness based practice has been grounded in the third key aspect, *Attitude*, which includes attributes such as compassion, being non-judgemental, trust, acceptance and curiosity (Shapiro et al., 2006). Shapiro et al. (2006) found that a shift in perspective occurred when IAA was cultivated simultaneously. This may lead to people having a more adaptive range of coping skills to manage life events, such as pregnancy and the transition to parenthood. Both life contexts formulated the focus of this study.

Benefits of Mindfulness during Pregnancy

Examples of benefits that specifically relate to the time of pregnancy and the transition to parenthood for couples include relationship satisfaction between couples, due to being able to constructively communicate in-the-moment during times of stress (Carson, Carson, Gil, & Baucom, 2006; Wachs & Cordova, 2007); mother-infant bonding (Michaud, 2012); and the ability for the baby, once born, to self-regulate both psychologically and biologically (Michaud, 2012).

The Impact on a prenate of not being mindful

It is thought that a prenate experiences a birthmother's emotions, both positive and challenging ones, through the secretion of hormones that cross the placenta (Chamberlain, 1998). For example, when a mother consistently perceives events and situations during pregnancy to be stressful, the prenate may be the recipient of stress hormones (e.g., Christensen, 2000; Lazarus & Folkman, 1984; Peckham, 2013). Mothers being mindful – choosing to change negative thoughts and emotions to healthier ones – may assist a prenate to attain normal levels of development (Chamberlain, 1998; Van de Carr & Lehrer, 1998). More recent research has proposed that creating a safe in-womb environment through mindfulness based interactions between an expecting couple and their prenate, may form the basis of secure attachment for the baby (Eichorn, 2012).

There has been a small yet growing emergence of research studies that have examined effectiveness of PPN parenting interventions incorporating mindful and intentional practices. Specifically, the use of such practices has been explored to mitigate maternal stress, anxiety and depression (Dunn, Hanieh, Roberts, & Powrie, 2012; Giardinelli et al., 2012; Goodman et al., 2014; Wilson & Wilson Peters, 2013); navigate childbirth (Duncan & Bardacke, 2010; Hauck, Fisher, Byrne, & Bayes, 2016); and making a successful transition to parenthood as a couple (Gambrel & Piercy, 2015). Each of these contexts is discussed with examples of related studies.

Impacts of maternal stress, anxiety and depression

A plethora of research has focused on the impact of maternal stress, anxiety and depression on the prenate. Siegel (1999) purported that one mind (pregnant mother) can influence the activity

and development of another (prenate), through the transfer of energy. Thoughts and emotions of the pregnant mother being exchanged to the prenate is one example. McCraty, Bradley, and Tomasino (2004) suggested that transferred thinking and emotional patterns may imprint on the growing brain of the prenate. This may further impact the future health of the prenate as they become biochemically primed to respond to life events outside of the womb in the way they were "taught" in the womb (Lazarus & Folkman, 1984; Wilson & Wilson Peters, 2013).

O'Donnell et al. (2009) determined that maternal anxiety and stress (e.g., daily hassles, state and trait anxiety, pregnancy related anxiety, relationship challenges and life event stress) can increase the risk of adverse neurodevelopmental outcomes in the newborn, due to prenate exposure to the maternal environment. Siegel (2010a) further suggested that the quality of neural pathways and synaptic connections for future relational skills of a developing prenate (and infant once born), are influenced by the quality of relational interactions provided by primary caregivers starting in the prenatal period. The ability of expecting mothers and fathers to provide quality mindful interactions with a prenate is thought to be directly related to their levels of stress experienced (Rifkin-Graboi, Borelli, & Bosquet Enlow, 2009).

In response to Rifkin-Graboi et al.'s (2009) hypothesis, participating parents in the current study were directly asked

1. How often they mindfully interacted with their prenate during pregnancy (especially during times of stress where they were experiencing emotions such as anger, frustration, sadness, or hurt); and
2. Their beliefs about the extent to which their baby may have been influenced by their thoughts, emotions, beliefs, moods and state of mind during the pregnancy.

Beneficial outcomes and challenges may result for mothers, fathers and baby depending on whether mindfulness skills are practiced by expecting parents (e.g., pausing and being present in-the-moment, and meditation).

The use of mindfulness-based practice may help foster secure parent-baby attachment (Siegel, 2010a), since the more attuned expecting parents are to their habitual thoughts, emotions and actions, the more conscious, positive choices can be made when relating to the prenate. The objective is to promote thoughts, emotions and actions that are aligned with secure attachment (e.g., having thoughts that welcome the baby, based on the baby being wanted and loved; and, as a couple, choosing to have respectful communication with each other) (Siegel, 2010a).

From a neuroscience perspective, mindfulness based practices may stimulate new, more healthy and positive ways of thinking and feeling. With repetition over time, this may create new neural pathways in the brain that become new habits (Siegel, 2011). In the context of the mother-baby connection in-utero, the new habit may be modelling a secure attachment relationship (Siegel, 2011).

The parent sample in the current study was asked to identify the types of things they thought during pregnancy as well as what they said to their baby during pregnancy. The goal was to learn what opportunities may exist for the inclusion of mindfulness-based communication skills in future PPN parenting programs.

It has been shown that expecting mothers who participate in conscious communication and dialogue with their prenate (Raffai, 1997; Schroth, 2010), may experience reduced stress levels and greater ability to manage stressful situations in a positive way (Dunn et al., 2012). Conversely, disorders such as anxiety and depression may prevail (Greeson, Garland, & Black, 2014) when a person:

1. is unaware of their unhelpful thought processes and emotional responses to life experiences and stressful events, and
2. does not change behavior to be aligned with healthy, connection oriented options (such as finding positive aspects to a current situation).

This was theorized to be due to attentional bias being focused on the unhelpful aspects of a current situation (Greeson et al., 2014).

Harris and Seckl (2011) reason that as a result of the constant biochemical interplay between mother and prenate during pregnancy, a pathway may be created for intergenera-tional transmission of responses to life events (both positive and negative). Harris and Seckl (2011) advocate for pregnant women to be educated on intentional stress management practices. Kluny and Dillard (2014) concurred and championed mothers being taught mindfulness skills to mitigate stress experienced during pregnancy and to create a healthy biochemical environment for the prenate.

Kluny and Dillard (2014) acknowledged that it may be very challenging for expecting mothers to avoid stress with modern day society and lifestyle being busy and filled with competing priorities. However, a mother being able to counteract stress is thought to be essential for the provision of a positive environment for a developing prenate (Chamberlain, 2013; Michaud, 2012).

Mindfulness based approaches for the PPN time frames

Two leading mindfulness based approaches that have been examined in the PPN context have been studied and discussed widely in the literature. They included Mindfulness Based Stress Reduction (MBSR: Kabat-Zinn, 1990) and Mindfulness Based Cognitive Therapy (MBCT: Segal, Williams, & Teasdale, 2002).

MBSR was the first of the approaches developed in the 1970s. This was created originally to assist people with chronic pain (Kabat-Zinn, 1990). The program was delivered in a group setting, spanning eight sessions on a weekly basis, with homework tasks included. The curriculum included moving and sitting meditations, stress reactivity and coping strategies and ways for respondents to become present and intentional during engagement in many routine daily tasks, such as eating and communicating (Burke, 2010).

The second approach, MBCT, utilized the same skills as MBSR and also included psycho-education-based tools adapted specifically for treating adults with depression (Segal, et al., 2002). The approach was later adapted for adults who experienced anxiety (Evans et al., 2008) and mood disorders (Ree & Craigie, 2007).

Both MBSR and MBCT are embedded in Buddhist philosophy that meditative practices can enhance mental, physical and emotional health (Baer, 2003). The efficacy of both MBSR and MBCT has been examined extensively through both clinical and non-clinical empirical research since the turn of the 21st century. Adult populations who have experienced stress, chronic pain, eating disorders, addictions, cancer, and anxiety and depression (e.g., Baer, 2003; Ivanovski & Malhi, 2007) have been studied. When physical and psychological health has been measured (Baer, 2003), meta-analysis results revealed medium effect sizes (d=.50-.59) for problems such as reduced pain in chronic pain sufferers, relapse prevention with substance abuse cohorts, increased coping skills when stressed, self-regulation when anxious, cognitive change away from unhelpful beliefs, reduction in panic attacks and reduction in binge eating episodes.

Mindfulness for the prenatal time

A range of PPN parenting programs have focused on mindfulness skills that target stress, anxiety and depression experienced by mothers and fathers during the time of a pregnancy, and have been reviewed in the literature. Programs and related studies that influenced the current study are discussed below.

Mindfulness based Childbirth and Parenting *(MBCP)*
An adaptation of MBSR (Kabat-Zinn, 1990) for use during the prenatal time is the Mindfulness based Childbirth and Parenting program, developed by Bardacke (1998). The aim of the program was to promote wellbeing, adaptive coping strategies and reduce negative impacts of stress on the mother and prenate during pregnancy. This was achieved through intentional meditation practices (Duncan & Bardacke, 2010). The aim was to target the innate challenges of emotional, bodily and lifestyle changes that unfold during pregnancy, that can be experienced as stressful by some expecting mothers (Duncan & Bardacke, 2010).

An MBCP program was piloted utilizing 35 pregnant mothers in their second and third trimesters of pregnancy (Bardacke, 1998). Participants were based in California (Duncan & Bardacke, 2010).. The program encompassed nine, three-hour sessions that were administered weekly. It was hypothesized that participants would report reduced stress, anxiety and depression, as well as increased mindfulness and positive affect upon completion of the program (Duncan & Bardacke, 2010). Throughout the program, participants were taught mindfulness meditation and given practice time in class. Additionally, they were required to use the skills at home for 30 minutes a day, six days a week. Social connection and support between participants was cultivated to mitigate possible isolation in the immediate time post birth. To achieve this, group sharing was encouraged and social time was built into each session. Content topics spanning nine sessions included bonding, childbirth experiences, yoga, body scan technique, silent meditation, loving kindness meditation, breastfeeding, and the biological, social and emotional needs of a newborn. Paired *t*-tests revealed large effect sizes for reductions in anxiety (*d*=.81) and increased mindfulness (*d*=.74). These results were in support of the researchers' hypothesis and of Stress and Coping Theory. A further 85 % of the participating expecting mothers stated that they used the meditation techniques during times of stress upon completion of the program (Duncan & Bardacke, 2010).

This was consistent with earlier research (Carmody & Baer, 2008; Carmody, Baer, Lykins, & Olendzki, 2009) and suggested that a mindfulness based intervention that focuses on the prenatal time may be a useful influencer on chosen stress response. This may have a potential positive effect on the prenate in terms of reduced stress-based biochemicals being transmitted across the placenta (Harris & Seckl, 2011; Wilson & Wilson Peters, 2013).

Limitations of the study included small sample size and absence of a control group. This was consistent with other research on mindfulness based practices for the prenatal period (Baer, 2003). An opportunity exists in future research involving PPN parenting programs for pregnant couples to offer randomized clinical trials that include a waitlist control group.

Coping and anxiety through living mindfully.
It is very common for women to experience anxiety during pregnancy (with between 12% and 39% of pregnant women diagnosed with one or more specific anxiety disorders, Giardinelli et al., 2012). Maternal anxiety has been linked to negative maternal, birth and postnatal outcomes. Examples include: birth complications, reduced neurodevelopment of the prenate, low birth weight babies, inability to breastfeed, and challenges with mother-infant bonding (e.g., Berle et

al., 2005; Cantwell & Smith, 2006; Dunkel Schetter, & Tanner, 2012; George, Luz, Tychey, Thilly, & Spitz, 2013; Giardinelli et al., 2012; Milgrom et al., 2008).

Proposed explanations for a woman's predisposition to anxiety during pregnancy have included hormonal changes, stress, fear of pregnancy outcomes and of labor and birth, change in lifestyle, and subsequent impacts on partner relationship, as well as physical discomfort (Wenzel, 2011). Mindfulness based interventions have been tested in non-clinical settings with improved outcomes on anxiety, stress and depressive levels in pregnant populations (e.g., Duncan & Bardacke, 2010; Dunn et al., 2012). However, these clinical studies did not include specific treatment of maternal anxiety using mindfulness based interventions. In an effort to close this gap, Goodman et al. (2014) adapted MBCT to target these issues and created the Coping and Anxiety through Living Mindfully (CALM) Pregnancy program.

A pilot study of the CALM program was conducted and included 23 pregnant women with elevated anxiety symptoms, recruited from hospitals and obstetric practices in Boston, Massachusetts. Baseline scores were assessed with the Penn State Worry Questionnaire and the GAD-7 (Goodman et al., 2014). CALM was adapted to include: (a) the traditional tools and skills of MBCT (as identified earlier), (b) mindfulness practice to be used during childbirth (Bardacke, 2012), and (c) self-compassion and self-acceptance when experiencing anxiety during the pregnancy (Germer, 2012; Roemer, Orsillo, & Salters-Pedneault, 2008). The pilot program was delivered by a trained facilitator and included two-hour weekly sessions over eight weeks. Homework activities were assigned in accordance with MBCT protocol, and participants were required to complete pre- and post-intervention self-report questionnaires (Goodman et al., 2014). Results from repeated measures ANOVAs revealed statistically significant improvements in levels of anxiety, worry, and depression ($p<.01$). Significant improvements were also reported for self-compassion and mindfulness ($p<.01$). Participants were asked for feedback on what was useful from the CALM program. Responses included: learning from other women in the group, mindfulness skill building, decreased reactivity when anxious, and increased insight and self-kindness (Goodman et al., 2014).

Three prominent limitations of the CALM study were reported, including the absence of a control group, small sample size (limiting the ability to report conclusions that were generalisable), and possible bias from self-report measures of change. Nevertheless, the statistically significant results suggested that the CALM program may be an effective, non-pharmaceutical based intervention for women with maternal anxiety (Goodman et al., 2014).

In summary, research has shown that if a pregnant woman experiences stress, anxiety, worry or depression, so does the prenate by way of chemical transfers across the placental barrier (O'Donnell et al., 2012). These transfers may also work in a positive direction (Chamberlain, 2013). Thus, if a mother experiences an increase in psychological and emotional wellbeing via PPN parenting programs such as CALM, constructive post-birth outcomes may result. Examples include: enhanced bonding and attachment between mother and baby, increased ability to start and maintain breastfeeding and an optimistic transition to parenthood for a couple (Goodman et al., 2014).

Mindfulness use for the transition to parenthood

In the context of transition to parenthood, mindfulness studies have traditionally focused on stress management (Singh et al., 2010), marriage and family therapy, plus anxiety and pain tolerance (Gambrel & Piercy, 2015). Explorations including mindfulness based techniques in couples-based PPN parenting programs is emerging, and one recent example is discussed.

Mindful transition to parenthood program

Gambrel and Piercy (2015) developed the Mindful Transition to Parenthood Program for couples expecting their first child. The four-week program was derived from the theoretical underpinnings of interpersonal neurobiology (Siegel, 1999) and the MBSR program (Kabat-Zinn, 1990). It was created in an attempt to mitigate the reduction in couple relationship satisfaction that is common once the transition to parenthood has occurred (Cowan, 1992; Feinberg, Roetter, Jones, Paul, & Kan, 2015).

Interpersonal neurobiology draws largely on concepts from Attachment Theory, mindfulness and neuroscience, and is based on Siegel's (1999) perspective that brain development of a prenate, infant and child occurs in part as a result of a parent's/primary caregiver's attuned caregiving and attachment skills. Siegel (1999, 2010b) stated that in order to provide optimal caregiving that enables secure attachment for the baby (Cassidy & Shaver, 1999), a parent needs to be attuned. Attunement has been defined as "how we focus our attention on others and take their essence into our own inner world" (Siegel, 2010b, p. 34). By being attuned, Siegel (2007, 2011) posited that new neural networks and pathways are created in the brain, enabling new ways of thinking, acting, and overall behaving. To be attuned, a person (in the context of this study, a parent) needs to exercise focused attention by first pausing in the moment (Siegel, 2011). The intention is for expecting parents and partners in a couple relationship to behave in ways that lend themselves to positive emotional regulation, reduced negative reactivity to life events and situations, healthy stress management and secure attachment in the couple relationship (Gambrel & Piercy, 2015). The pivotal focus on *attention* with *intention* described is in alignment with Shapiro et al.'s (2006) key underpinnings for mindfulness (IAA) discussed earlier.

The premise underlying Shapiro et al.'s (2006) interpersonal neurobiology is that when parents can attune to what is happening within themselves (this is enhanced through skills taught in mindfulness practice), they can develop enhanced attunement to the impact their chosen ways of being and behaving in their relationships have on others.

The Mindful Transition to Parenthood Program included four content topics that were delivered across four sessions, facilitated weekly to groups of couples. The themes included mindfulness of self, partner, relationship and family (Gambrel & Piercy, 2015). In a phenomenological study, 13 non-distressed couples from the East Coast of the USA completed the program. The couples also participated in a 45-minute, semi-structured interview conducted one week post program completion. The aim was to determine respondent experiences in the program. Four themes emerged from the interviews (Gambrel & Piercy, 2015):

1. positive changes for self (e.g., "regulating emotions")
2. improvements in couple relationship (e.g., "communication with partner more direct and harmonious")
3. more prepared for the arrival of baby (e.g., "accepting potential challenges in the transition to parenthood"), and
4. male involvement (e.g., "increasing involvement in the pregnancy as I felt heard").

Limitations of the study were highlighted. First was the lack of use of a clinical-based experimental methodology. As a result, neither the long-term effects of the program nor its effectiveness (when compared to a control group), could be determined. Second, traditional MBSR programs involve eight sessions (Kabat-Zinn, 1990), and Gambrel and Piercy's (2015) study, included four. Future research could compare the four-week Mindful Transition to Parenthood program with an eight-week equivalent to determine how many sessions are needed for effective results (Gambrel & Piercy, 2015).

Limitations

Despite these advances, an array of limitations were identified across the studies discussed and included: (a) small sample sizes; (b) the absence of randomized control groups in some studies; (c) the inability to determine causal outcomes due to the correlational approaches taken in data analysis; (d) the use of self-report measures exclusively, introducing the possibility of respondent bias; and (f) lack of clinical experimental methodology to determine long-term effects of the program being measured.

Considering these limitations in the context of the current study, sample size was calculated in alignment with thematic analysis best practice (Fugard & Potts, 2015). With regards to self-reporting, respondents in the current study were required to self-report their beliefs and perceptions. However, due to the exploratory nature of the study, this was considered appropriate.

Further empirical literature has focused on mindfulness based programs that target the PPN time frame (e.g., Duncan & Bardacke, 2010; Vieten & Astin, 2008). Results have largely been positive, including: (a) reduced maternal stress, anxiety and depression (e.g., Duncan & Bardacke, 2010; Harris & Seckl, 2011); (b) a healthy biochemical environment for mother and prenate (Kluny & Dillard, 2014); and (c) enhanced capacity for caregiver-prenate secure attachment. This has been shown to influence the ability for a person experiencing securely attached relationships throughout the lifespan (e.g., Fonagy, 2001; Siegel, 2010b).

Current study

Aims and research questions

The current study was exploratory in design and elicited the subjective opinions and experiences from both mothers and fathers.
Two research questions shaped the study:

1. What perceptions exist about whether mothers' and fathers' thoughts, emotions, beliefs, moods, state of mind, and quality of the partner relationship during the pregnancy influences a prenate?
2. To what extent do mothers and fathers consciously choose to communicate with their baby throughout pregnancy?

The study aimed to extend current empirical evidence by exploring mindfulness based behavior of mothers and fathers toward their prenate.

Methods

University ethics approval was received.

Participants

A total of 61 respondents voluntarily participated in this study. To be included in the study, participants needed to be currently pregnant (or have a partner expecting if male), or already have birthed or fathered one or more children. Further, English had to be their first language, or they needed to be fluent at reading and writing English. While 65 people began the survey, four subjects did not complete beyond the first half of the survey. The corresponding incomplete data was removed from the study.

The sample comprised 54 females (88.5%) and 7 males (11.5%), aged between 19 and 65, (M= 38.98, SD = 9.74). Demographic characteristics of participants were reported in Table 1. The intention was to gather data from a global population to identify target populations who may

benefit from support during the PPN time frames. Additionally, it was anticipated that an international sample would potentially highlight universal trends, enabling inferences about generalizability of the content to be included in future programs.

Recruitment was achieved through the use of various online noticeboards where it was free to advertise information on research studies (e.g., Berkeley Parenting Group), and social media sites worldwide (e.g., Facebook). The advertisements contained links for interested mothers and fathers to complete the online surveys anonymously. Permission was sought and granted from site administrators prior to posting on social media pages (where it was not possible to directly post the request for respondents).

Participation was confidential, voluntary and anonymous. There was a twenty-dollar compensation per participant, in the form of an online voucher (e.g., Amazon and Coles/Myer), funded by the university faculty. A free e-book on conscious parenting was offered as a further gesture of thanks. To ensure anonymity, no identifying information was collected on the online survey platform. To receive the voucher and e-book, participants were guided at the end of the online survey to contact the student researcher directly. This ensured the student researcher could not link contact details to data entries in the survey, ensuring anonymity of the data.

Table 1.*Demographics of Study Participants*

Variable	n	%	M (years)	SD (years)	Range (years)
Age			38.98	9.74	19-65
Gender					
Female	54	88.5			
Male	7	11.5			
Nationality					
American	23	37.7			
Australian/NZ	26	42.6			
Canadian	2	3.3			
European	6	9.8			
Other	1	1.6			
Relationship length	61	100.0	5.61	2.14	<1 to 20+
Education level					
High school	13	21.3			
Vocational	7	11.5			
Diploma	18	29.5			
Bachelor's degree	18	29.5			
Master's degree	3	4.9			
Doctoral	2	3.3			
Attended pregnancy program					
Yes	23	37.7			
No	38	62.3			
Currently pregnant	3	4.9			
Birthed 1+ children	58	95.1			
Partner response to pregnancy					
Positive	36	59.0			
Mixed	15	24.6			
Negative	9	14.8			

Materials

A series of demographic questions plus qualitative open-ended questions under five subheadings

(self-regulation, intentionality, co-regulation, bonding post birth, and support) was completed by the respondents via the online survey program, Psychdata.

Procedure

Respondents clicked on the link provided in the recruitment advertisements which guided them to the online survey titled "Bonding and attachment between mom, dad and baby during pregnancy and beyond" on Psychdata. Upon reading the explanatory statement respondents were asked to indicate their understanding and consent by checking "Y" before being granted access to the survey questions. Once consent had been given, respondents completed the demographic and open-ended questions that related to them. Where questions related to certain circumstances (i.e., being a mother, a father, or only relating to people who have birthed their children already), respondents were given clear instructions of action required.

Results

Manual thematic analysis was undertaken to organize, analyze and examine themes and trends from the information obtained in the open-ended question surveys, ensuring common content was categorized (Braun & Clark, 2006; Tesch, 1990; Weber, 1990). For thematic analysis, the sample size of 61 was deemed adequate to ensure patterns could emerge and reach saturation point (Creswell, 1998; Guest, Bunce, & Johnson, 2006), yet not be too large for data management (Fugard & Potts, 2015). This approach was chosen to make clear comparisons (Braun & Clark, 2006). The questions included in the online survey were determined and categorized for logical flow and ease. The questions were based on gaps highlighted in the PPN literature specifically pertaining to: (a) existing PPN parenting programs (e.g., Collins & Fetsch, 2012; Johansson, Landahl, & Adolfsson, 2011; Vieten & Astin, 2008); (b) critical elements of secure bonding and attaching (e.g., Eichorn, 2012; Harrison & Sidebottom, 2008;Young, 2013); (c) impacts of epigenetics during the gestation period (Anacker, O'Donnell, & Meaney, 2014; Doughty, 2007; Janov, 2015; Lipton, 2008); and (d) mindfulness of expecting parents (e.g., Baer, 2003; Burpee & Langer, 2005; Duncan & Bardacke, 2010; Dunn et al., 2012; Siegel, 2010a).

The data was analyzed to allow categories to emerge through thematic analysis, rather than having set categories determined from the onset. This enabled a more experiential approach. The literature supported that this method provides greater accuracy in the analysis of the data (Clarke & Braun, 2013; Roulston, 2001). Braun and Clarke's (2006) five-step thematic analysis approach was chosen, as it enables themes to be highlighted to reveal more understanding on research questions when there is a paucity of consistent findings in literature. Additionally, Braun and Clarke's (2006) approach allows for the rigor of auditability, enhancing trust in the findings (Hollins Martin, & Robb, 2013). The five-step process was diligently followed to ensure coding represented an accurate reflection of the subject's intended meaning. Themes identified by the author were also confirmed by a second person, who was a professional researcher. The five steps followed for each open-ended question manual analyzed included:

1. Familiarizing yourself with your data.
2. Generating initial codes.
3. Searching for themes.
4. Reviewing themes.
5. Defining and naming themes.

The online survey contained 26 questions that were thematically analyzed. Upon completion of reading the data corpus multiple times, as per step one of Braun and Clarke's (2006) approach to thematic analysis, the verbatim data revealed "mindfulness: the power of parents' influence on a prenate as a topic for investigation" (seven of the open-ended questions directly related to this topic). The author completed step one again, examining the data corpus from the related 7

questions. Based on this, two sub-sections were identified for analysis and discussion. They were:

1. Perceptions about whether a prenate may be influenced by parent's thoughts, emotions, beliefs, moods, state of mind, and quality of partner relationship during the pregnancy; and
2. Regularity of mothers and fathers talking to their prenate during the pregnancy in general and when difficult conversations that involved emotions such as anger, frustration, sadness, or hurt were occurring between the expecting couple.

Perceptions about whether a prenate is influenced by their mother's and father's thoughts, emotions, beliefs, moods, state of mind, and quality of partner relationship during the pregnancy.

Four themes emerged when respondents were asked about perceptions of the level of influence a mother's and father's thoughts, emotions, beliefs, moods, state of mind, and quality of partner relationship have on a prenate and baby post birth. They were:

1. *Definitely Yes:* indicated by participants recording they absolutely believed that a baby is influenced by thoughts, emotions, beliefs, moods, state of mind and quality of partner relationship during pregnancy. Examples included: "I was stressed and my baby doesn't settle"; "my husband and I fought a lot and baby is insecure", "they are sentient and learn about life while growing inside", "my pregnancy was calm and I was supported and my child is self-assured", "babies are fully conscious in-utero", "first pregnancy we were nervous and that baby is nervous and clingy. Second pregnancy we were calm and baby is relaxed", "they are an extension of the mom", "goes for both positive and negative emotions", "they know no other way of sensing their place in the world than through the emotional tone of the unborn environment"; "how my partner and I are, impacts me, which impacts baby", "the baby can sense the energy of the parents".
2. *Somewhat*: indicated by participants recording they somewhat believed that a baby is influenced by thoughts, emotions, beliefs, moods, state of mind and quality of partner relationship during pregnancy. Examples included: "to some extent", "it all impacts the baby and I don't know how to quantify how much the impact is".
3. *No:* indicated by participants recording they did not believe that a baby is influenced by thoughts, emotions, beliefs, moods, state of mind and quality of partner relationship during pregnancy. Examples included: "makes no difference", "babies are not influenced by moods in the womb", "there are no long-term effects on a baby", "there is no influence during a pregnancy".
4. *Unsure:* indicated by participants recording they were unsure if a baby is influenced by thoughts, emotions, beliefs, moods, state of mind and quality of partner relationship during pregnancy. Examples included: "not something I am aware of", "it may just be all fate, where the baby is meant to experience whatever happens in the womb".

Of the mothers *(n*=54) 77.78% (*n*=42) responded "*Yes"*; 3.70% (*n*=2) answered "*Somewhat"*; 3.70% (*n*=2) stated "*No"*; 9.26% (*n*=3) responded being "*Unsure"* and a final 11.00% (*n*=5) chose to not respond. Of note, the fathers (*n*=7) identified with either "*Yes"* (66.66%) or "*Unsure"* (33.33%) only. Further one participating father shared that he thought only the mother would influence a prenate with her thoughts, emotions, beliefs, moods, state of mind during pregnancy.

Regularity of mother's and father's talking to their prenate during the pregnancy.

Four themes became evident when parents were asked about the regularity with which they would talk to their prenate during the pregnancy, and included:

1. *Often*: indicated by participants recording talking to their prenate daily. Examples included: "daily", "both talked to, sang"; "when anything came along that felt unsafe or upsetting I assured her it was mine, not hers and not to worry", "how are you doing in there?", "I would ask him how he was feeling, what part of him was growing today".

2. *Sometimes:* indicated by participants recording talking to their prenate once they could feel movement. Examples included: “quite funny sitting on the couch singing wiggles songs to my wife’s belly”, “talk to them about relevant things—footy and camping and fishing”.
3. *Rarely:* indicated by participants recording talking to their prenate on the odd occasion. Examples included: “I don’t think I got that I should on a regular basis”.
4. *Never***:** indicated by participants recording they did not talk to their prenate at all. Examples included: “not at all”; “it is too early”, “it seems silly to have a running conversation with them in-utero”.

Of the 61 parents 50.82% (*n*=31) of responses created the theme of “often”; 13.11% (*n*=8) related to “sometimes”; 21.32% (*n*=13) matched the theme of “rarely” and 13.11% (*n*=8) of responses were associated with “never”. One person (1.64%) chose to not answer the questions. There were no differences in the pattern of responses between mothers and fathers.

Talking to the prenate when difficult conversations that involved emotions such as anger, frustration, sadness, or hurt were occurring between the expecting couple.

Two themes were evident when parents were asked whether they talked to their prenate during times when they were having difficult conversations as a couple (denoted by emotions such as anger, frustration, sadness, or hurt being present). The themes were:

1. *Yes:* indicated by participants recording clear agreement. Examples included: “I explained it logically to the baby”, “that is wasn’t their fault that they were ok, I was ok”, “it will be all right, it will be fine, do not worry. I will take care of you”, “my wife would talk to the baby and say things like "don’t worry, mom and dad are just tired and got upset. We still love you and each other", “sorry bubba".
2. *No:* indicated by participants recording clear disagreement. Examples included: “I wish I had”, “I wasn’t conscious about it”, “no that seems crazy. I don’t really think of the baby as a separate entity yet”, “I never talked to the baby about it because it was so early on”, “I didn’t know any better back then”, “no, but that would have been a good idea”, “I had no part in talking to the baby while inside my wife”, “did not consider it”.

Of the 61 respondents 19.67% (*n*=12) shared responses that related with the theme of “yes”; 73.77% (*n*=45) with “no”; and two people (6.56%) chose to not respond. There were no differences in the pattern of responses between mothers and fathers.

See summary of Thematic Analysis Results in Table 2.

Discussion

This study was designed to gather data to inform the development of relevant content, format, structure, delivery types and timing for future PPN parenting programs. The data was compared with current theory and literature and each of the research questions is discussed in order.

Research Question 1: What perceptions exist about whether mother’s and father’s thoughts, emotions, beliefs, moods, state of mind, and quality of the partner relationship during the pregnancy influences a prenate?

The results showed that the majority of participant mothers and fathers reported “definitely yes” in response to research question one. This was expressed by comments such as “I was stressed and my baby doesn’t settle”. This awareness and perception was consistent with research pertaining to early childhood policy making and practices (Shonkoff, 2011), neuroscience (Lipton, 2008; Siegel, 2010b), Attachment Theory (Atzil et al., 2013; Siegel, 2011), and PPN psychology where it is purported that maternal thoughts, emotions, moods as responses to internal and external events faced during pregnancy, may be experienced by a prenate via biochemical hormones crossing the placental barrier (Chamberlain, 2013; Lazarus & Folkman, 1984).

Table 2. Summary of Thematic Analysis Results (n=61)

	Examples of Verbatim Responses
Perceptions about whether prenates are influenced by mothers' and fathers' thoughts, emotions, beliefs, moods, state of mind, and quality of partner relationship during the pregnancy:	
Somewhat	I was stressed and my baby doesn't settle My husband and I fought a lot and baby is insecure They are sentient and learn about life while growing inside My pregnancy was calm and I was supported and my child is self-assured Babies are fully conscious in-utero First pregnancy we were nervous and that baby is nervous and clingy. Second pregnancy we were calm and baby is relaxed They are an extension of the mum Goes for both positive and negative emotions They know no other way of sensing their place in the world than through the emotional tone of the unborn environment How my partner and I are, impacts me, which impacts baby The baby can sense the energy of the parents
Somewhat	To some extent It all impacts the baby and I don't know how to quantify how much the impact is
No	Makes no difference Babies are not influenced by moods in the womb There are no long-term effects on a baby There is no influence during a pregnancy
Unsure	Not something I am aware of It may just be all fate, where the baby is meant to experience whatever happens in the womb
Regularity of mothers and fathers talking to their prenate during the pregnancy:	
Often	Daily Both talked to, sang When anything came along that felt unsafe or upsetting I assured her it was mine, not hers and not to worry How are you doing in there? I would ask him how he was feeling, what part of him was growing today

(*Table continued*)

(Table 2 continued)

Sometimes	Quite funny sitting on the couch singing wiggles songs to my wife's belly Talk to them about relevant things—footy and camping and fishing
Rarely	I don't think I got that I should on a regular basis
Never	Not at all It is too early It seems silly to have a running conversation with them in-utero
Talking to the prenate when difficult conversations that involved emotions such as anger, frustration, sadness, or hurt were occurring between the expecting couple	
Yes	I explained it logically to the baby That is wasn't their fault that they were ok, I was ok It will be all right, it will be fine, do not worry. I will take care of you My wife would talk to the baby and say things like: don't worry, mum and dad are just tired and got upset. We still love you and each other Sorry bubba
No	I wish I had I wasn't conscious about it No that seems crazy. I don't really think of the baby as a separate entity yet I never talked to the baby about it because it was so early on I didn't know any better back then No, but that would have been a good idea I had no part in talking to the baby while inside my wife Did not consider it

Of interest was the verbatim response by one of the participating fathers where it was perceived that "only the mother would influence a prenate with her thoughts, emotions, beliefs, moods, state of mind during pregnancy". Whilst conclusions could not be drawn from this statement given it was one person's perspective, it was consistent with research where the focus was on the impact of the expecting mother's influence on the prenate (e.g., Chamberlain, 1998; Harris & Seckl, 2011; Kluny & Dillard, 2014; Van de Carr & Lehrer, 1988).

Research [explored the impact of perceived level of partner support on mother's thoughts, emotions, and moods during pregnancy which then impacts the prenate (e.g., Harrison & Sidebottom, 2008; Heinowitz, 1995). An obvious gap in existing empirical research was the lack of direct measurement of the influence of the expecting father's thoughts, emotions, moods, beliefs and state of mind during the pregnancy on the growing prenate. This presented an opportunity of focus for future research.

Attachment Theory (Ainsworth, Blehar, Waters, & Wall, 1978) was relevant when perception about the quality of partner relationship as an influencing factor on the prenate was considered from research question one. Prior research indicated that interactions between a couple during the time of pregnancy, that facilitate a safe and secure attachment environment between the couple (e.g., via respectful and loving communication, having understanding for differences in opinion) may lay the foundation for secure attachment for the baby (Eichhorn, 2012). This was evidenced in the current study with verbatim comments such as “how my partner and I are, impacts me, which impacts baby”, and “the baby can sense the energy of the parents”, and “my husband and I fought a lot and baby is insecure”. Further, from a neuroscience perspective, research has indicated that the quality of the relational interactions provided by an expecting couple impacts the neural pathways and synaptic connections that relate to relationship skills of a developing prenate (Rifkin-Graboi et al., 2009; Siegel, 2010b).

Given that ten of the participating parents responded either “no” or “unsure”, it may be valuable to include educational content grounded in the science of PPN psychology that includes mindfulness, to address the potential influence of parental thoughts, emotions, moods, beliefs and quality of partner relationship during pregnancy on a prenate.

Research Question Two: Do mothers and fathers consciously choose to communicate with their babies throughout pregnancy?

When examining the second research question, two areas were investigated. They included: (a) the regularity of talking to the prenate, and (b) talking to the prenate when difficult conversations that involved emotions such as anger, frustration, sadness, or hurt were occurring between the expecting couple. When regularity of talking to the prenate was considered, the themes of “often”, “sometimes”, “rarely and “never” emerged. With 63.93% of participants responding either “often” or “sometimes”, this spoke to awareness in parents that a prenate may well be conscious and influenced by what is happening to them in the in-utero environment.

This finding was consistent with PPN psychology literature (e.g., Chamberlain, 2011; Emerson, 1993) and Attachment Theory (Bowlby, 1988). Specifically, mindfulness research has shown that for couples who intentionally communicated with each other in a constructive way during times of stress, relationship satisfaction increased (Carson, et al., 2006; Wachs & Cordova, 2007). This positively impacted a growing prenates’ brain and psychosocial development (Rifkin-Graboi et al., 2009). The remaining 36% of participating parents in Study 2 identified as either “rarely” or “never” communicating with their prenate consciously. The impact of communicating with the prenate directly through the time of pregnancy has not been directly measured in existing literature.

Curiously, even though 64% of participating parents reported talking to their prenate “often” or “sometimes”, 74% of parent participants stated “no” when asked whether they talked to their prenate when difficult conversations that involved emotions such as anger, frustration, sadness, or hurt were occurring between the expecting couple (e.g., “no that seems crazy. I don’t really think of the baby as a separate entity yet”, “no, but that would have been a good idea”). Only 20% stated “yes” (e.g., “my wife would talk to the baby and say things like "don’t worry, mom and dad are just tired and got upset. We still love you and each other"). This indicated that while expecting parents did mindfully communicate with their prenate, the majority did not when times were stressful in the couple relationship. Given that the research showed that quality of couple relationship can be an influencing factor on the prenate’s physical (Joyce, 1990), cognitive (Siegel, 2010b), psychological and social functioning (Doss, Rhoades, Stanley, & Markman, 2009) as well as on attachment style (Chamberlain, 2011; Young, 2013), there appears to be a divide between research and lay person (parent) knowledge. Including current research as educational content in future PPN parenting programs may be one way to close this gap in knowledge.

Limitations

There were two limitations that directly applied to this study.

1. By having the questionnaire available for online completion, the depth of analysis was possibly inhibited. This may have been overcome if interviews or focus groups were conducted and this has been found by others (Hollins Martin & Robb, 2013).
2. The minimal response by males to this study, whilst congruent with the literature (e.g., Consonni et al., 2010) indicated that the thematic results may not be reflective of the general father population. If this study was to be repeated, mothers and fathers would be targeted separately in advertising campaigns for recruitment, instead of advertising for "parents" to complete the study. The goal would be to recruit an equal sample of mothers and fathers and then determine proportions of who attend PPN parenting programs. This was made obvious to the author when one of the male respondents asked prior to his completion, if he could fill out the questionnaire, even though the advertisement asked "are you a parent?" the respondent stated "I assumed it was only for mamas".

Future Directions

A myriad of learnings from the current study assisted in the formation of questions utilized in two Delphi methodology studies undertaken in the dissertation project. Specifically, opinions were sought from expert parents' and birth professionals' on the perceived need for:

1. Education on the influence of the expecting father's thoughts, emotions, moods, beliefs and state of mind during the pregnancy on the mother and growing prenate;
2. Education on the potential influence of thoughts, emotions, moods, beliefs and quality of partner relationship during pregnancy on a prenate;
3. Skills on how to be mindful with thoughts, emotions and actions;
4. Skills on how to communicate mindfully with a prenate during times of stress, conflict and challenge, and
5. Education drawing on neuroscience, explaining brain development of a prenate during pregnancy and the fourth trimester.

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